UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/065,331	10/04/2002	Pierino Bonanni	121601-1	2194

6147   7590   06/29/2005

GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
PATENT DOCKET RM. BLDG. K1-4A59
NISKAYUNA, NY 12309

EXAMINER
LE, JOHN H

ART UNIT	PAPER NUMBER
2863	

DATE MAILED: 06/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

AK

	Application No.	Applicant(s)
Office Action Summary	10/065,331	BONANNI ET AL.
	Examiner	Art Unit
	John H. Le	2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>09 June 2005</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

  4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-5,7-24,26 and 29-32* is/are allowed.

6)☒ Claim(s) *27 and 28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 December 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

  Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

  Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

  a)☐ All b)☐ Some * c)☐ None of:

    1.☐ Certified copies of the priority documents have been received.

    2.☐ Certified copies of the priority documents have been received in Application No. _____.

    3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
      application from the International Bureau (PCT Rule 17.2(a)).

  * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
  Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
  Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

Response to Amendment

1.   This office action is in response to applicant's amendment received on

06/09/2005.

Claims 1, 5, 7, 11, 12, 23, 27, and 32 have been amended.

Claims 6 and 25 have been cancelled.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Khalid (USP 6,231,306) in view of Orme et al. ("Flight Assessment of the Onboard

Propulsion System Model for the Performance Seeking Control Algorithm on an F-15

Aircraft", NASA, July 1995).

Regarding claim 27, Khalid teaches a system for detecting precursors to

compressor stall/surge 116 comprising at least one sensor 132 positioned at said

compressor 116 to monitor at least one compressor parameter (e.g. Col.2, lines 59-65),

said at least one sensor outputting raw data representative of said at least one

compressor parameter (e.g. Figs.1, 2, Col.3, lines 6-26); a pre-filter to reject undesirable

signals from said raw data (e.g. Fig.2, Col.3, lines 43-65), said pre-filter comprises a

band-pass filter (172) centered on a locally dominant component of the input signal

(band-pass filter frequency input between 150Hz-180Hz, Col.3, lines 57-60).

Regarding claim 28, Khalid teaches said locally dominant component is tip-

passage frequency of said compressor (e.g. Col.3, lines 57-66).

Khalid fails to teach a frequency demodulator receiving said raw data,

demodulating said raw data, and producing demodulated data; a Kalman filter obtaining

stall precursors from said demodulated data.

Orme et al. teach a frequency demodulator (Performance Seeking Control PSC)

receiving said raw data (pressure signal), demodulating said raw data, and producing

demodulated data (e.g. Fig.2, Page 5); a Kalman filter obtaining stall precursors from

said demodulated data (e.g. Fig.3, Page 5).

It would have been obvious to one of ordinary skill in the art at the time the

invention was made to include a frequency demodulator and a Kalman filter as taught

by Orme et al. in a control system for preventing a compressor stall in a gas turbine

engine of Khalid for purpose of providing improving the performance of an airplane

(Orme et al., Page 3).

Allowable Subject Matter

4.   Claims 1-5, 7-24, 26, 29-32 are allowed.

The following is a statement of reasons for the indication of allowable subject

matter:

Regarding claim 1, none of the prior art of record teaches or suggests the

combination of a method for detecting precursors to compressor stall/surge, wherein the

method comprising steps of: monitoring at least one compressor parameter to obtain raw data representative of said at least one compressor parameter; pre-processing said raw data using a frequency demodulator to produce pre-processed data comprising at least one demodulated signal having an amplitude corresponding to the instantaneous frequency of a locally dominant component of an input signal; post-processing said pre-processed data using a Kalman filter to obtain stall precursors. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 5, none of the prior art of record teaches or suggests the combination of a method for detecting precursors to compressor stall/surge, wherein the method comprising steps of: monitoring at least one compressor parameter to obtain raw data representative of said at least one compressor parameter; wherein said monitoring comprises sampling and digitizing signals representing said at least one compressor parameter to obtain time-series analyzed data; pre-processing said raw data using a frequency demodulator to produce pre-processed data, said pre-processing being at least partially performed in the digital domain; post-processing said pre-processed data using a Kalman filter to obtain stall precursors.. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 11, none of the prior art of record teaches or suggests the combination of method for detecting precursors to compressor stall/surge, wherein the method comprising steps of: monitoiing at least one compressor parameter to obtain raw data representative of said at least one compressor parameter; pre-processing said raw data using a frequency demodulator to produce pre-processed data, said preprocessing being performed at least partially in the analog domain, wherein said pre-processing comprises producing a demodulated signal having an amplitude corresponding to the instantaneous frequency of a locally dominant component of an input signal; and post-processing said pre-processed data using a Kalman filter to obtain stall precursors. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 23, none of the prior art of record teaches or suggests the combination of a system for detecting precursors to compressor stall/surge comprising: at least one sensor positioned at said compressor to monitor at least one compressor parameter, said at least one sensor outputting raw data representative of said at least one compressor parameter; a frequency demodulator receiving said raw data, demodulating said raw data, and producing demodulated data; a Kalman filter obtaining stall precursors from said demodulated data; and a calibration system for sampling and digitizing output from said at least one sensor to obtain time-series analyzed raw data. said frequency demodulator receiving said time-series analyzed raw data. It is these limitations as they are claimed in the combination with other limitations of claim, which

have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 32, none of the prior art of record teaches or suggests the combination of a system for detecting precursors to compressor stall/surge comprising: at least one sensor positioned at said compressor to monitor at least one compressor parameters said at least one sensor outputting raw data representative of said at least one compressor parameter; a frequency demodulator receiving said raw data. demodulating said raw data and producing demodulated data; a Kalman filter obtaining stall precursors from said demodulated data; and a stall precursor measure system computing a standard deviation of innovations of said Kalman filter to determine a stall precursor signal. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Response to Arguments

5.   Applicant's arguments filed 06/09/2005 have been fully considered but they are not persuasive.

--Applicant argues that the prior did not teach "a band-pass filter centered on a locally dominant component of the input signal".

Examiner position is that Khalid teaches a band-pass filter (172) centered on a locally dominant component of the input signal (band-pass filter frequency input between 150Hz-180Hz, Col.3, lines 57-60).

Contact Information

6.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to John H Le whose telephone number is 571-272-2275. The examiner can normally be reached on 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E Barlow can be reached on 571-272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

John H. Le

Patent Examiner-Group 2863

June 25, 2005
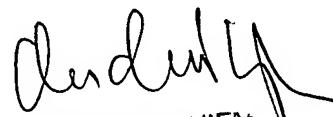
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PRIMARY EXAMINER